PATIENT CARE AND HOSPITAL EFFICIENCY ANALYSIS

A DATA-DRIVEN APPROACH TO OPTIMIZE HOSPITAL PERFORMANCE

OBJECTIVE:

This project leverages healthcare datasets to uncover insights on hospital efficiency, patient care, and financial performance using SQL, Python and Power BI.

Key Deliverables:

- Six performance KPIs analyzed
- Dashboard with actionable insights
- Data-backed recommendations

Problem:

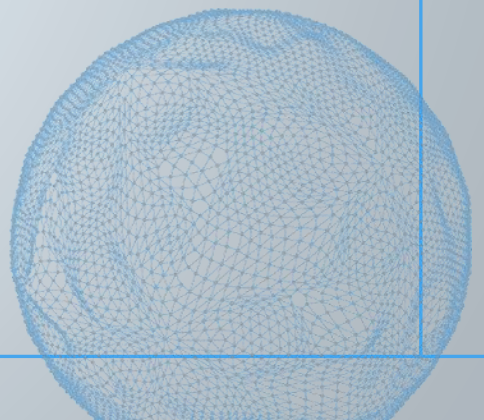
Inefficiencies in hospital operations lead to higher costs, longer stays, and poorer patient outcomes.

Solution:

Use SQL-driven KPIs, Python and Power BI to monitor performance metrics like Length of Stay, Readmission, and Revenue.

Impact:

Enables better resource allocation, improved patient care, and data-informed decision-making.



1. **What:** Analyze operational KPIs for hospitals
2. **Why:** Identify performance gaps and drive improvements
3. **Where:** Medicare Inpatient Provider Data (US hospitals)
4. **Who:** Data Analysts, Hospital Admins, Healthcare Stakeholders
5. **How:** SQL + Python + Power BI to extract, process, and visualize insights

Dataset used:

- (by_providers): Hospital-level service metrics.
- (by_geography): Regional breakdown of services.
- Joined using state mappings to create a unified dataset.

Row Analyzed:

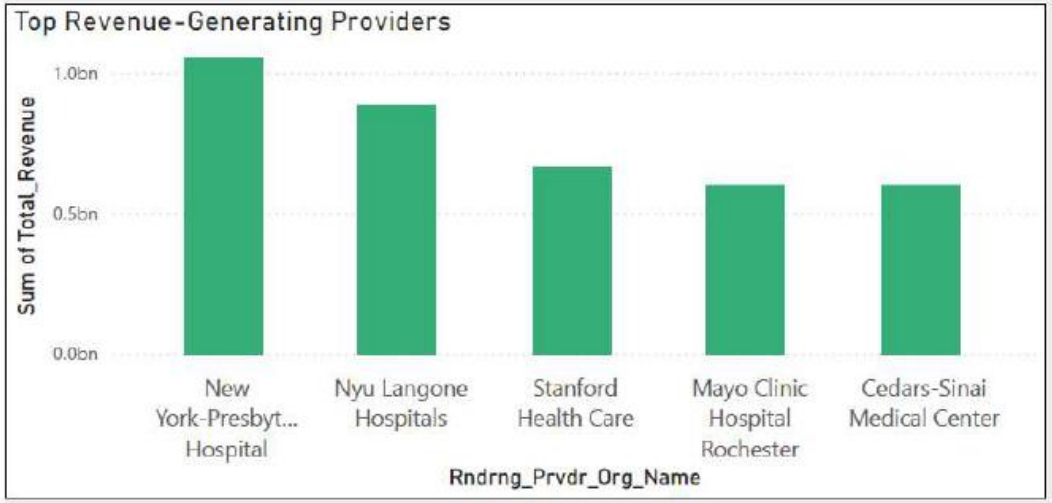
Over 200,000+ provider records and 10,000+ state-level records.

Key Metrics

1. Average length of stay per (ALOS)
2. Highest readmission risk
3. Top revenue-generating Organizations
4. Ranking of the Provider as per Length of stay (LOS)
5. Net - Revenue after insurance
6. Departments Utilization

Patient Care & Hospital Efficiency Analysis Dashboard

HOSPITAL EFFICIENCY ANALYSIS



Average Length of Stay per Hospital
1.28

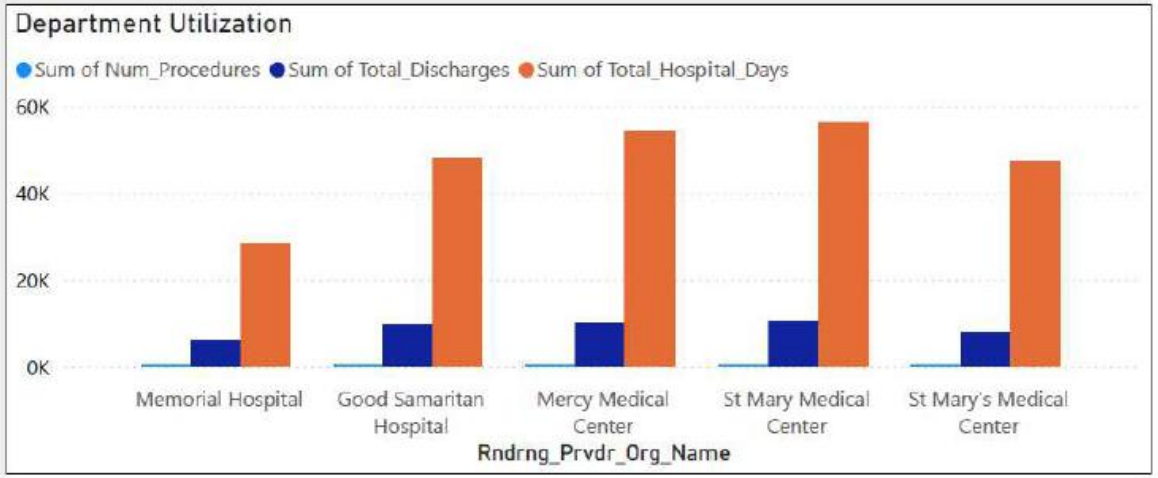
Total Revenue
4bn

Net Earnings
755M

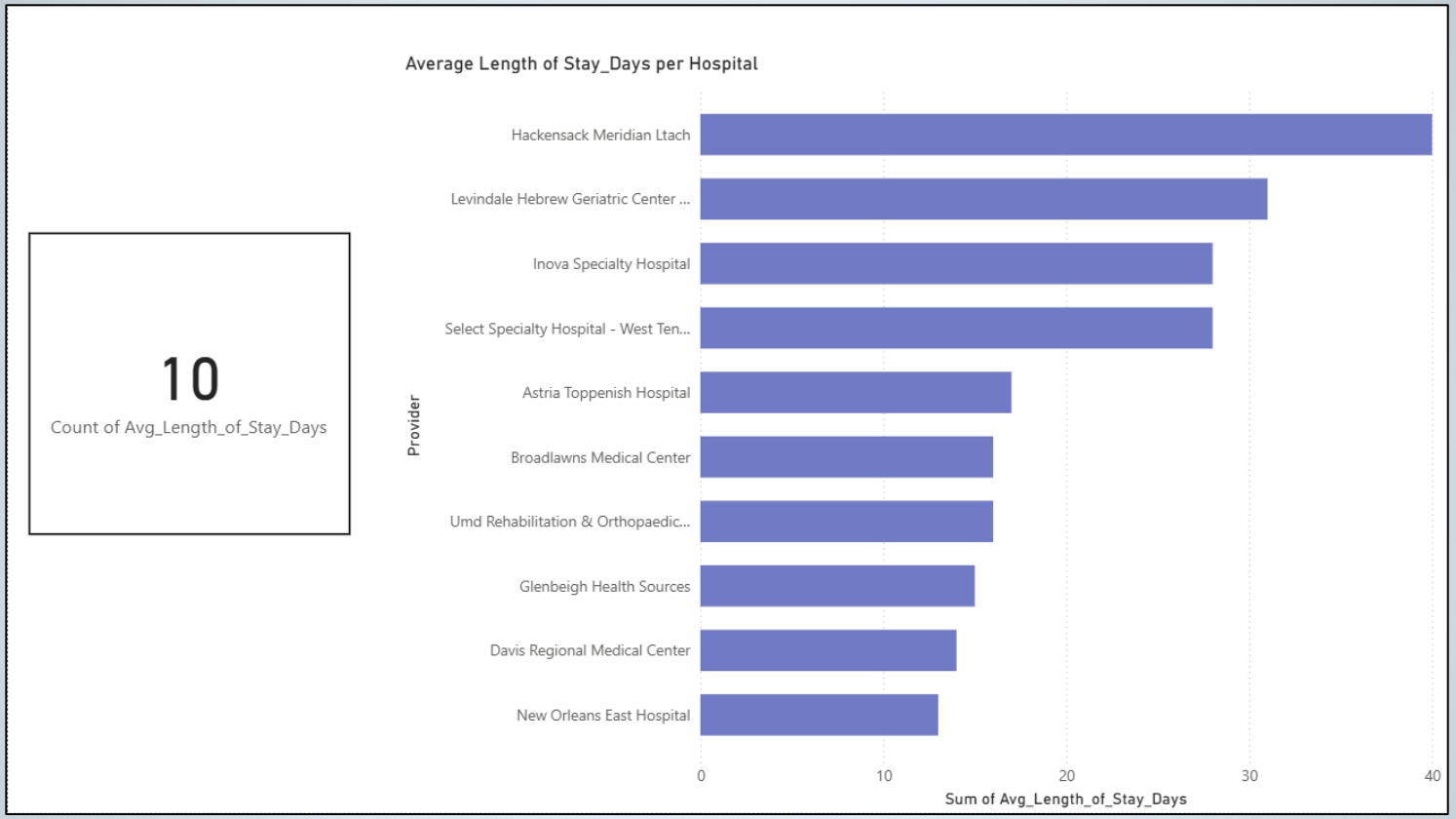
Average Length of Stay
10

High Readmission Risk Patients

Organisation_Name	Discharge_Count
St Mary's Medical Center	4
St Mary Medical Center	4
St Joseph Medical Center	4
Mercy Medical Center	4
Mercy Hospital	3
Memorial Medical Center	3
Memorial Hospital	6
Good Samaritan Hospital	4
Total	**32**

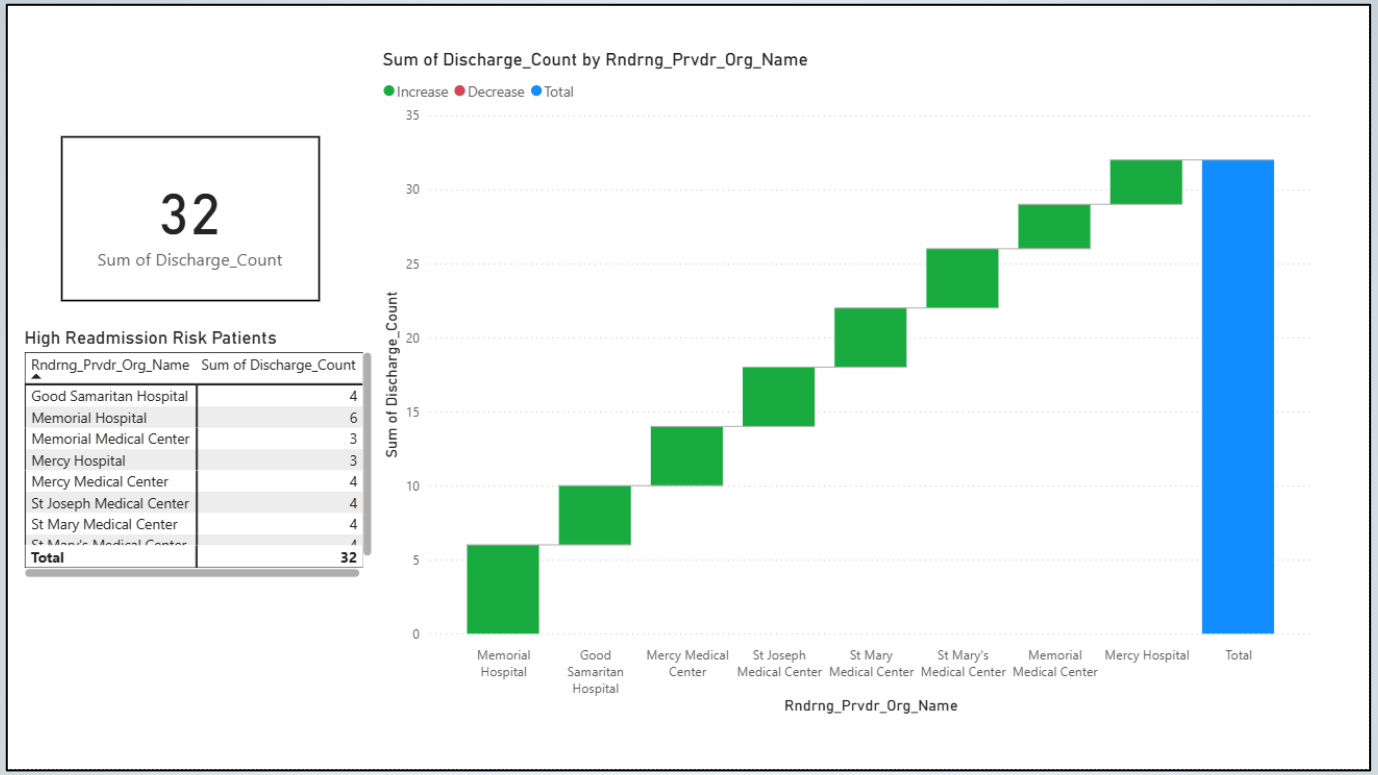


📍 Average Length of Stay (ALOS)



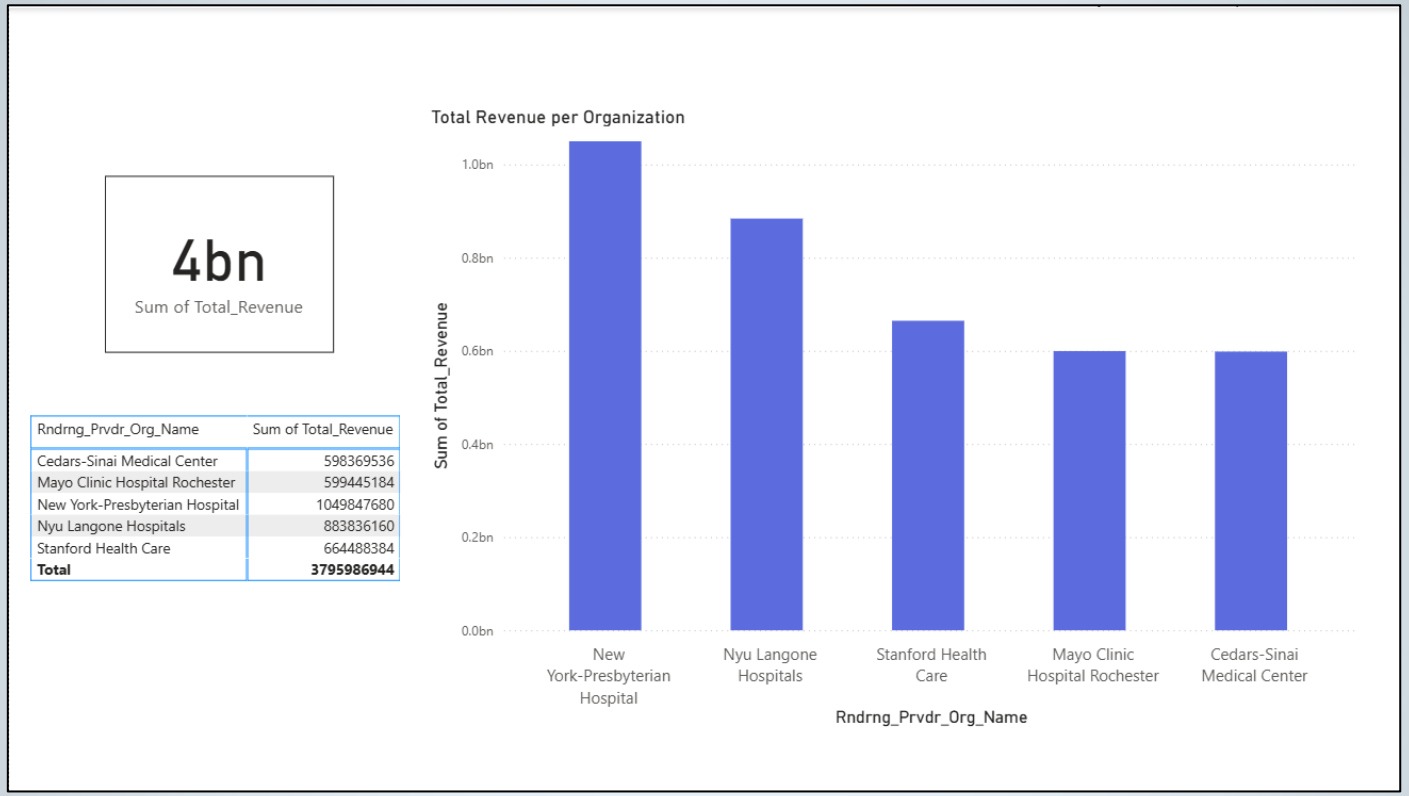
- **Inference:** A 5x difference in ALOS. High ALOS could indicate chronic/complex cases or inefficiency; low ALOS might reflect faster care transitions.

📍 Readmission Risk (High Discharge Count)



- Certain providers show **high readmission rates**, which may reflect issues in discharge planning or follow-up care.
- Providers with **low readmission risk** stand out for patient outcome quality.
- **Inference:** Identify facilities needing readmission reduction programs or quality audits.

📍 Total Revenue per Organization



Rndrng_Prvdr_Org_Name	Sum of Total_Revenue
Cedars-Sinai Medical Center	598369536
Mayo Clinic Hospital Rochester	599445184
New York-Presbyterian Hospital	1049847680
Nyu Langone Hospitals	883836160
Stanford Health Care	664488384
Total	**3795986944**

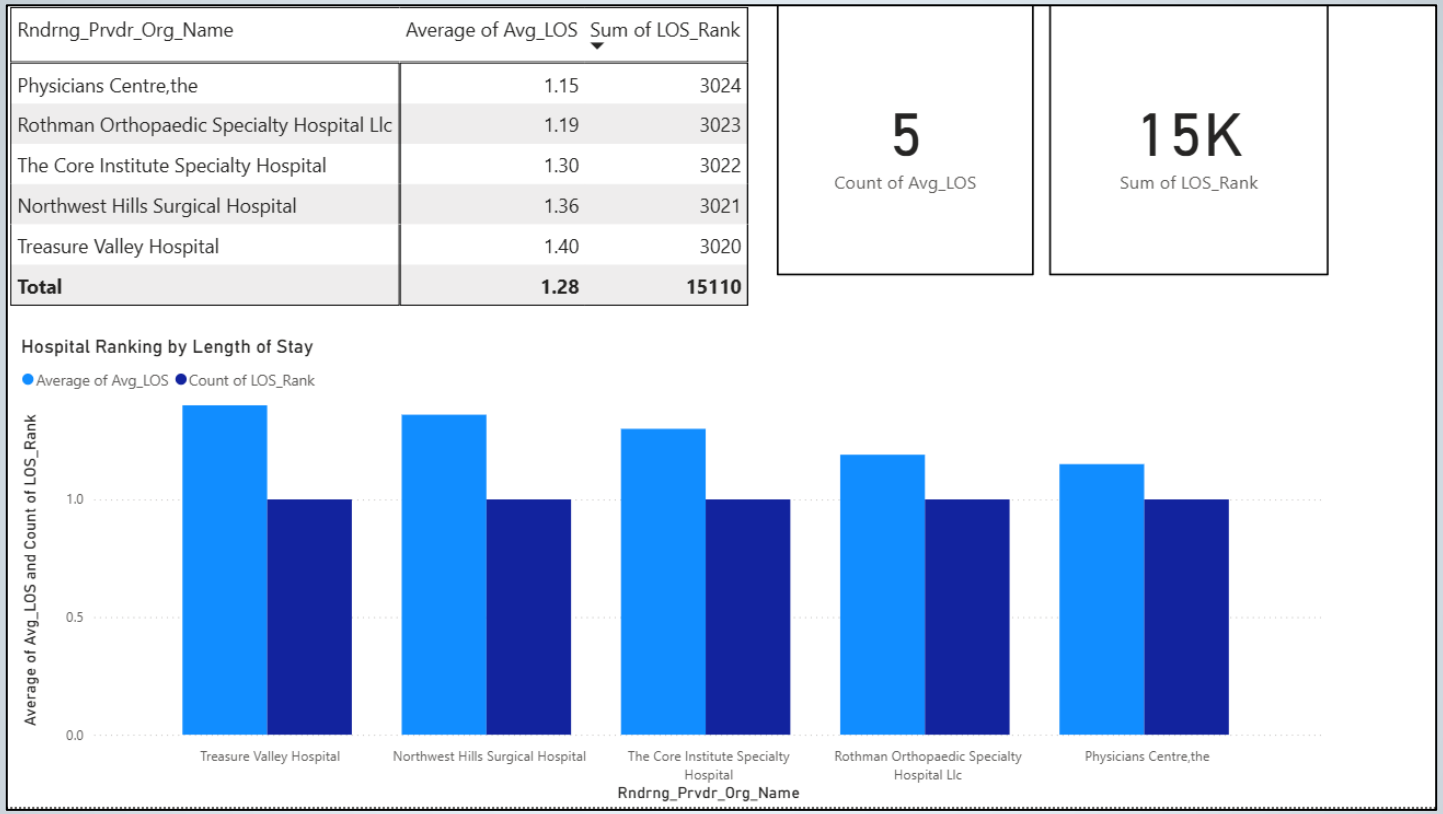
- New York Presbyterian Hospital generates **(~1 bn)** in revenue, making it the top revenue generating organization.
- **Inference:** LAC+USC leads in volume or pricing efficiency — a key revenue center
- These hospitals likely offer high-volume or specialized services.

📍 Hospital Ranking by Length of Stay (LOS)

Rndrng_Prvdr_Org_Name	Average of Avg_LOS	Sum of LOS_Rank
Physicians Centre,the	1.15	3024
Rothman Orthopaedic Specialty Hospital Llc	1.19	3023
The Core Institute Specialty Hospital	1.30	3022
Northwest Hills Surgical Hospital	1.36	3021
Treasure Valley Hospital	1.40	3020
Total	**1.28**	**15110**

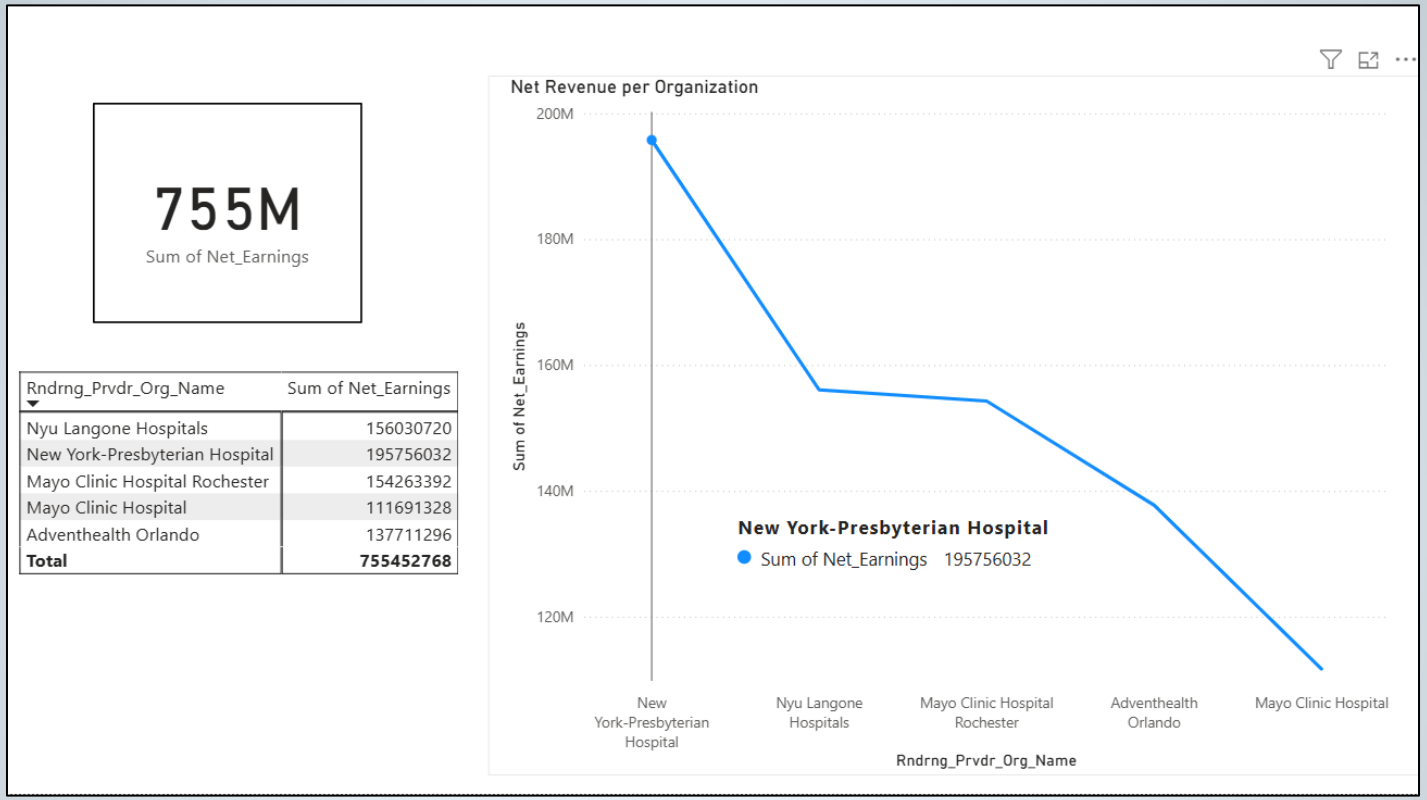
5
Count of Avg_LOS

15K
Sum of LOS_Rank



- Clear performance differences exist between providers based on their **average LOS**.
- **Top-ranked providers** have streamlined care paths; **bottom-ranked ones** may need training or resource support.
- **Inference:** Create performance-based incentives and support plans.

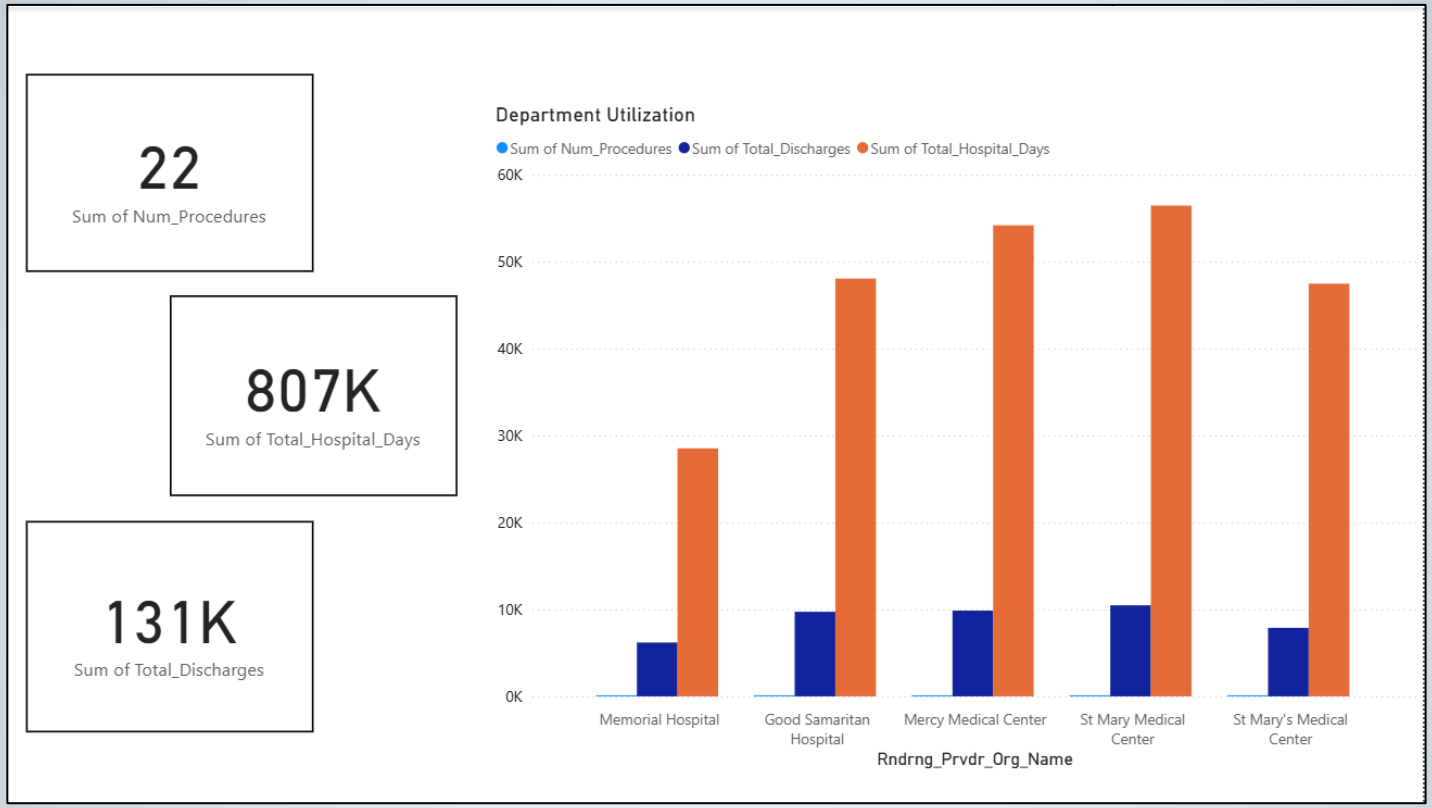
📍 Net Revenue after Insurance



Rndrng_Prvdr_Org_Name	Sum of Net_Earnings
Nyu Langone Hospitals	156030720
New York-Presbyterian Hospital	195756032
Mayo Clinic Hospital Rochester	154263392
Mayo Clinic Hospital	111691328
Adventhealth Orlando	137711296
Total	**755452768**

- Some hospitals earn **high gross revenue** but have **lower net earnings** after Medicare payments.
- A few providers show a **healthy margin**, indicating cost-efficient operations.
- **Inference:** Review reimbursement strategies; consider cost optimization in high-revenue but low-margin centers.

📍 Hospital Resource Utilization



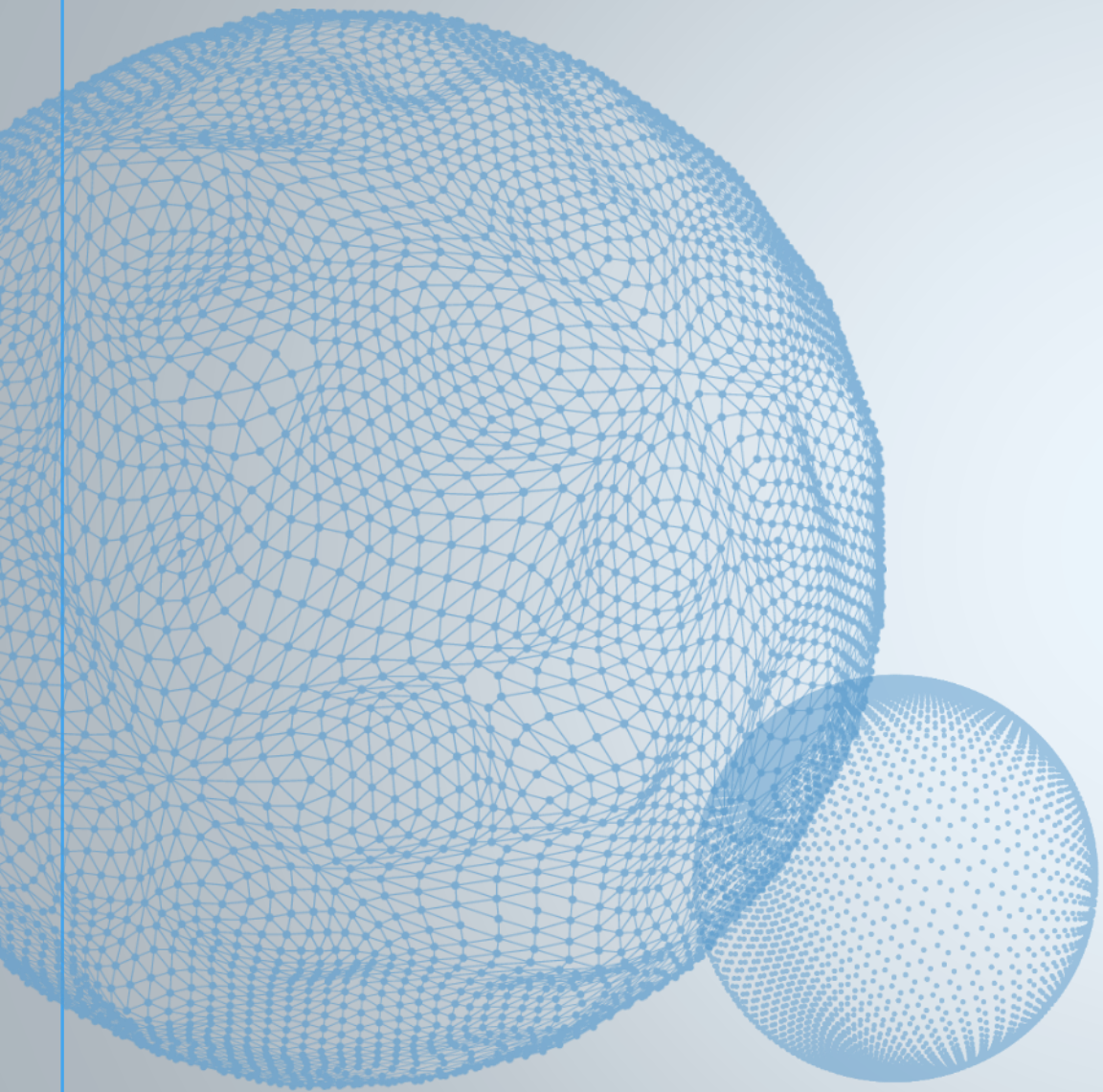
- Facilities with **high hospital days and discharges** indicate **high demand or overutilization**.
- Low utilization could suggest **underused capacity** or inefficient operations.
- **Inference:** Redistribute resources, manage load balancing across hospitals.

INSIGHTS DERIVED FROM ANALYSIS

1. Total **Revenue** Across All Providers: **$4 billion**
2. Total **Net Earnings: $755 million**
3. Top **5 hospitals** generate **~85%** of the total revenue.
4. **5 hospitals** contribute to **69%** (22/32) of **high-risk discharges**.
5. Overall **ALOS: 10 days**, **ALOS per Hospital** (Average across hospitals): **1.28 days**
6. **St Mary Medical Center** has **highest discharge** volume (~58k). And Mercy leads in procedures (~8k).

Recommendation:

- Improve discharge efficiency for high ALOS hospitals.
- Support underperforming doctors with training.
- Optimize high-utilization departments for resource balance.
- Focus on procedures with high revenue but low net earnings.



THANK YOU

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